Claims

What is claimed is:

1. An optoelectronic module ~~(1) having~~comprising:
- a transmitting and/or receiving element~~(6)~~,
- a mount ~~(5) on which~~for supporting the transmitting and/or receiving element~~(6) is arranged~~,
- a holding and coupling part~~(2), in which~~ for receiving the transmitting and/or receiving element ~~(6) is arranged~~ and which is at least partially filled with an encapsulation material~~(21)~~, and which has a coupling area ~~(27)~~ for ~~connection of~~receiving an optical waveguide, and
- an electrical drive and/or receiving circuit~~(32) for~~ coupled to the transmitting and/or receiving element~~(6)~~, ~~with~~
- wherein the encapsulation material ~~(21)~~ surrounds~~ing~~ the transmitting and/or receiving element ~~(6)~~ and ~~being~~is located at least partially in the holding and coupling part~~(2)~~,
- wherein the electrical drive and/or receiving circuit ~~(32)~~ is arranged outside the holding and/or coupling part~~(2)~~ on a submount~~(3)~~, which lies on a plane ~~which~~that runs parallel to the longitudinal axis of the coupling area~~(27)~~, and
- wherein the mount ~~(5)~~ is arranged at right angles to the submount~~(3)~~.

2. The module as claimed in claim 1, ~~characterized in that~~ wherein the holding and coupling unit~~(2)~~ forms a cylindrical cutout~~(25)~~, one of whose ends contains the transmitting and/or receiving element~~(6)~~, and whose other end forms the coupling area ~~(27)~~ for an optical waveguide.

3. The module as claimed in claim 1~~ 1 or 2~~, ~~characterized in that~~ wherein the mount~~(5)~~ is fitted only with the transmitting and/or receiving element~~(6)~~ or with the transmitting element and a monitor diode.

4. The module as claimed in ~~at least one of the preceding~~ claim~~s~~ 1, ~~characterized in that~~wherein the mount ~~(5)~~ is a leadframe, which provides an electrical link for the transmitting and/or receiving

element ~~(6)~~ and is electrically connected to the submount ~~(3)~~.

5. The module as claimed in claim 4, ~~characterized in that~~wherein the leadframe ~~(5)~~ runs at right angles to the longitudinal axis of the coupling area ~~(27)~~, at least in the area of the holding and coupling part ~~(2)~~.

6. The module as claimed in ~~at least one of the preceding~~ claim~~s~~ 1, ~~characterized in that~~wherein the encapsulation material ~~(21)~~ forms an integrated lens ~~(22)~~ on the side facing the coupling area.

7. The module as claimed in claim 6, ~~characterized in that~~wherein a fiber stop ring ~~(23)~~ is formed in the encapsulation material ~~(21)~~ around the lens ~~(22)~~ and prevents the end surface of an optical fiber which is inserted into the coupling area ~~(27)~~ from touching the lens apex.

8. The module as claimed in ~~at least one of the preceding~~ claim~~s~~ 1, ~~characterized in that~~wherein the module ~~(1)~~ is mechanically coupled to a plug housing ~~(71, 71', 16)~~.

9. The module as claimed in ~~at least one of~~ claim~~s~~ 1 ~~to 7~~, ~~characterized in that~~wherein the module ~~(1)~~ is mechanically coupled to a naked fiber adaptor ~~(9)~~.

10. The module as claimed in claim 9, ~~characterized in that~~wherein an optical fiber ~~(12)~~ is firmly clamped by means of a clamp ~~(11)~~ in an area of the naked fiber adaptor ~~(9)~~ which is in the form of a trough.

11. The module as claimed in claim 9, ~~characterized in that~~wherein the naked fiber adaptor ~~(9)~~ is formed by an extension to the cylindrical coupling area ~~(27)~~.

12. The module as claimed in ~~at least one of the preceding~~ claim~~s~~ 1, ~~characterized in that~~ wherein the submount ~~(3)~~ can be mounted on a main circuit board ~~(8)~~, in particular by SMD mounting.

13. The module as claimed in claim 12, ~~characterized in that~~wherein the main circuit board ~~(8)~~ is used as a heat sink for the submount ~~(3)~~ and/or for the electrical drive and/or receiving circuit ~~(32)~~ which is arranged on the submount ~~(3)~~, with the submount ~~(3)~~ having plated holes ~~(33)~~ which are also used for heat conduction.

14. The module as claimed in ~~at least one of the preceding~~ claims 1, ~~characterized in that~~wherein the holding and coupling part ~~(2)~~ and/or the submount ~~(3)~~ have/has self-coupling structures ~~(61, 62)~~ which allow automatic adjustment of the elements with respect to one another and/or with respect to a main circuit board ~~(8)~~.

15. The module as claimed in ~~at least one of the preceding~~ claims 1, ~~characterized in that~~wherein a housing cover ~~(4)~~ is provided and surrounds the submount ~~(3)~~ with the electrical drive and/or receiving circuit ~~(32)~~, and/or that end of the holding and coupling part ~~(2)~~ which faces away from the coupling area ~~(27)~~.

16. The module as claimed in ~~at least one of the preceding~~ claims 1, ~~characterized in that~~wherein the holding and coupling part ~~(2)~~ and/or the housing cover ~~(4)~~ are/is provided with an electrically conductive layer, and/or are/is composed of a conductive plastic material.

17. The module as claimed in ~~at least one of the preceding~~ claims 1, ~~characterized in that~~wherein the holding and coupling part ~~(2)~~ is in the form of a double chamber and, in parallel, separate areas, has firstly a transmitting element and secondly a receiving element, each of which can be coupled via a separate coupling area ~~(27)~~ to an optical fiber ~~(152)~~.

18. The module as claimed in ~~at least one of the preceding~~ claims 1, ~~characterized in that~~wherein the submount ~~(3)~~ is arranged underneath the coupling area ~~(27)~~ of the holding and coupling part ~~(2)~~.

~~19. A plug arrangement having a plug housing (16) and a plug (15), which represent separate units (16, 15) which can be plugged into one another, in particular for an optoelectronic module (1) as claimed in claim 1, wherein~~

- ~~the plug (15) has a housing (151) and at least one optical fiber (152), which is arranged in the housing (151) and projects out of it,~~
- ~~the plug (15) has a protective bracket (153), which is provided with openings (153a) for the at least one optical fiber (152), can move relative to the housing (151) and in the longitudinal direction of the optical fiber (152), and, when not inserted, is arranged in a locking position as protection in front of the optical fiber (152) which projects out of the housing (151),~~
- ~~the plug housing (16) has three steps by virtue of the fact that it has three areas whose internal diameters (161, 162, 164) are different, between which a first and second step stop (163) are formed, with the first step stop (163) on the plug housing (16) acting as a stop for the protective bracket (153), such that the protective bracket (153) is moved from the locking position to the first step stop during insertion of the plug into the plug housing (16), and is moved in the direction of the housing (151), with the at least one optical fiber (152) projecting from the corresponding opening (153a) in the protective bracket (153),~~
- ~~and with the second step stop acting as a stop for the end face of the housing (151).~~

~~20. The plug arrangement as claimed in claim 19, characterized in that the plug (15) contains two optical fibers (152), whose center axes are preferably separated by 5 mm.~~

~~21. The plug arrangement as claimed in claim 19 or 20, characterized in that the protective bracket (153) is connected to the housing (151) via attachment arms (153b) and is arranged such that it can be moved on the housing (151), and moves back to the~~

~~locking position, when the plug (15) is not inserted, during removal of the plug (15) from the plug housing (16).~~

~~22. The plug arrangement as claimed in claim 21, characterized in that the plug (15) has latching elements (156) via which the plug (15) can be latched in the plug housing (16).~~

19. An optoelectronic module comprising:

a submount (5) defining a plane;

a housing (2) mounted on the submount and defining an opening (25);

a control circuit mounted on the submount such that the control circuit is located outside of the housing;

an optoelectronic transducer (6) mounted inside the housing such that the optoelectronic transducer intersects an optical axis (29) extending substantially parallel to the plane and through the opening;

a mount (5) extending substantially perpendicular to the plane between the optoelectronic transducer and the submount; and

an encapsulation body (21) disposed inside the housing such that a portion (22,23) of the encapsulation body is located between the optoelectronic transducer and the opening.

20. An optoelectronic module comprising:

a printed circuit board (5) defining a plane;

a housing (2) mounted on the printed circuit board and defining an opening (25);

a control circuit (32) mounted on the printed circuit board such that the control circuit is located outside of the housing;

a lens (23) disposed inside the housing such that the lens defines an optical axis (29) extending through the opening and substantially parallel to the plane defined by the printed circuit board;

a leadframe (5) located inside of the housing and having a fixed end coupled to the control circuit, the leadframe extending substantially perpendicular to the plane defined by the printed

circuit board; and

an optoelectronic transducer (6) coupled to the leadframe and positioned inside the housing such that the optoelectronic transducer intersects the optical axis (29).